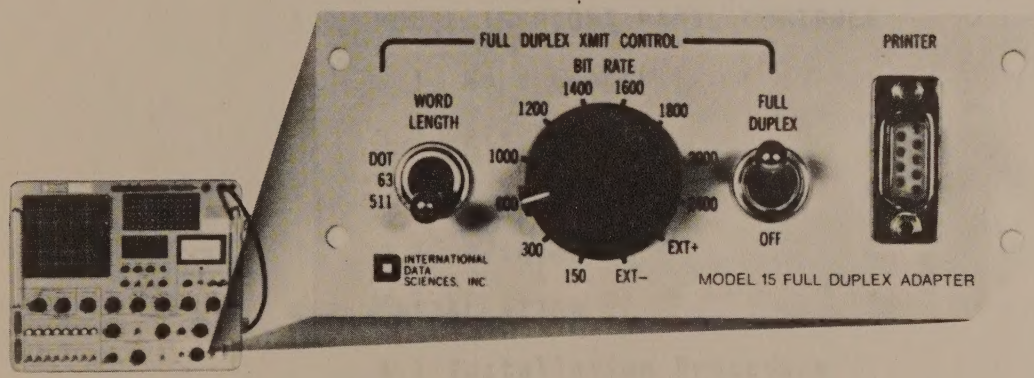
INTERNATIONAL
DATA
SCIENCES, INC.

INTERNATIONAL DATA SCIENCES, INC.

ADVANCED TECHNIQUES IN DATA COMMUNICATIONS

MANUAL OF OPERATION AND INSTALLATION INSTRUCTIONS FOR MODEL 15 FULL DUPLEX KIT FOR 914B



© COPYRIGHT INTERNATIONAL DATA SCIENCES, INC. 1973

100 NASHUA ST., PROVIDENCE, R.I. 02904, TEL. 401-274-5100 TWX (710) 381-0285

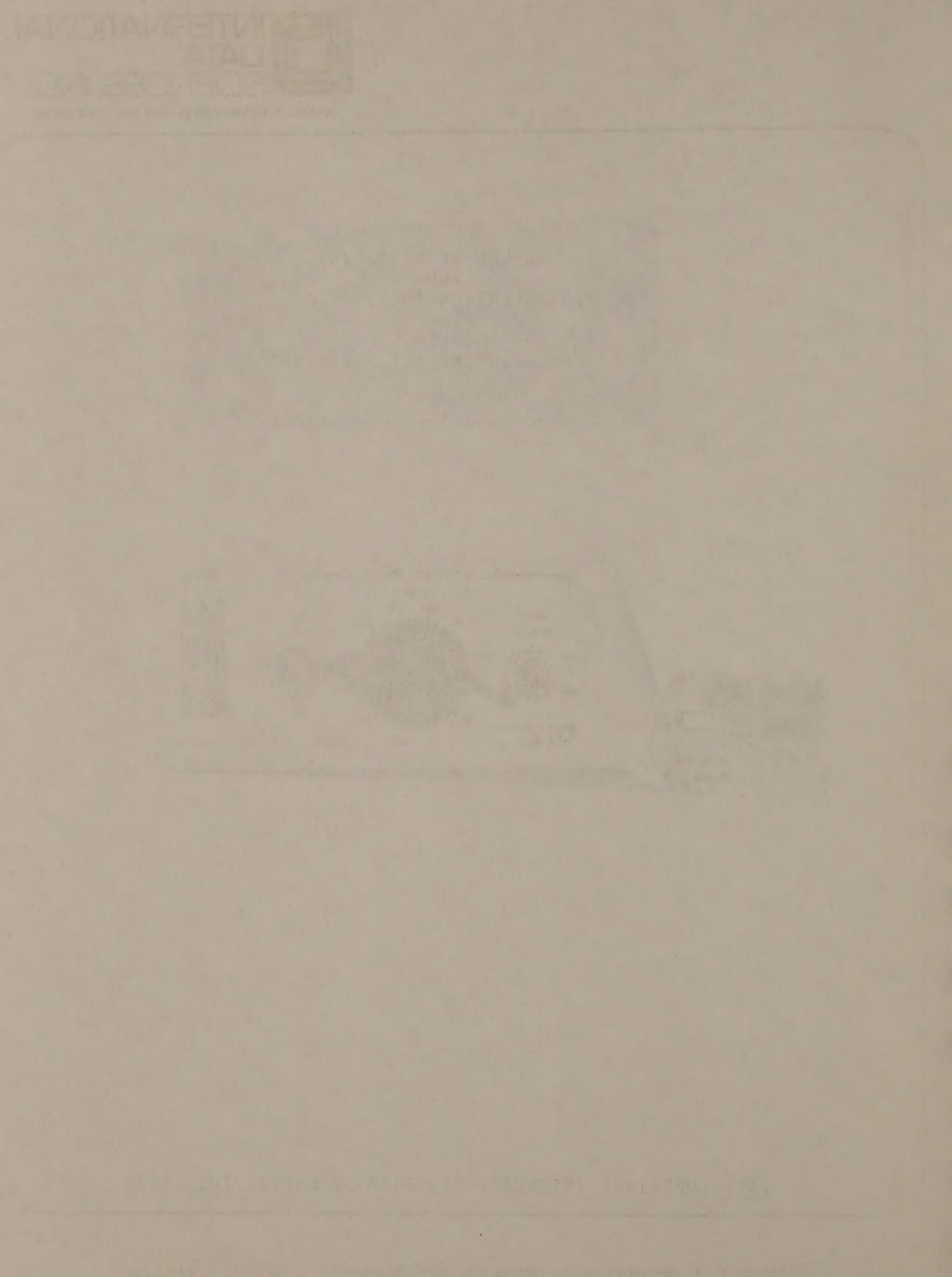


TABLE OF CONTENTS

1.0 INTRODUCTION

2.0 MODEL 15 OPERATION

- 2.1 Full Duplex Operation
- 2.2 Half Duplex or Simplex Mode

3.0 MODEL 15 FRONT PANEL CONTROLS

- 3.1 Word Length
- 3.2 Bit Rate
- 3.3 Full Duplex/Off
- 3.4 Printer

4.0 INSTALLATION

- 4.1 Installation Procedure

5.0 SELF TEST

- 5.1 Initial Conditions
- 5.2 Printer Interface Test

CALIBRATION AND REPAIR SERVICE

WARRANTY

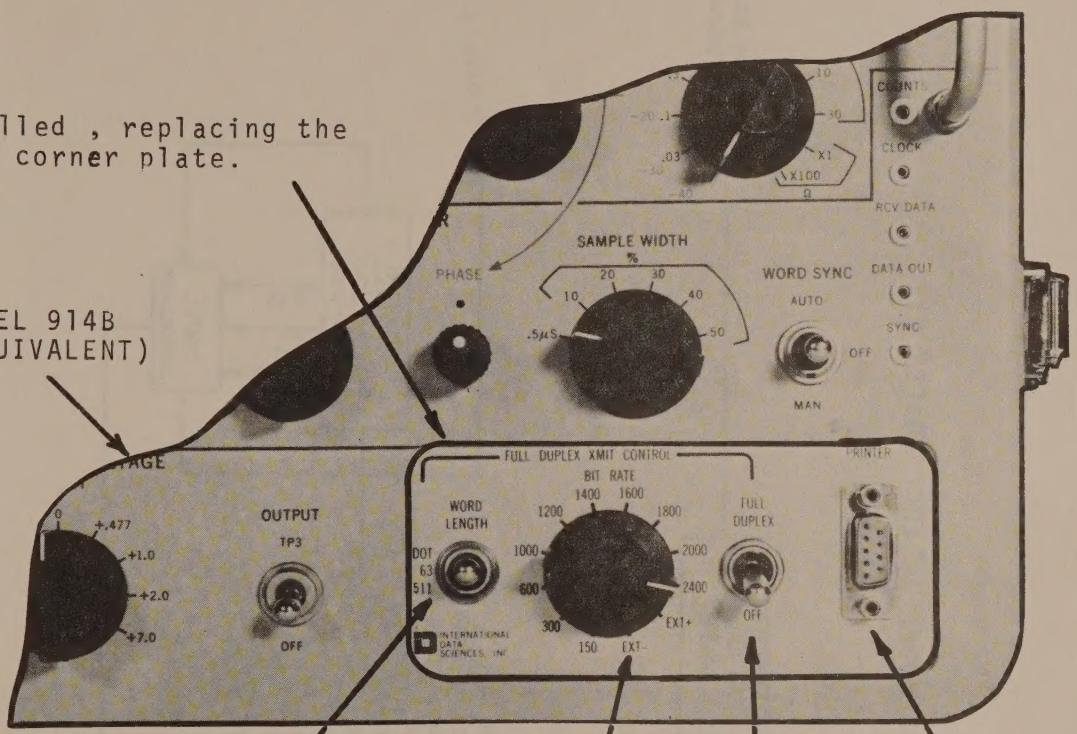
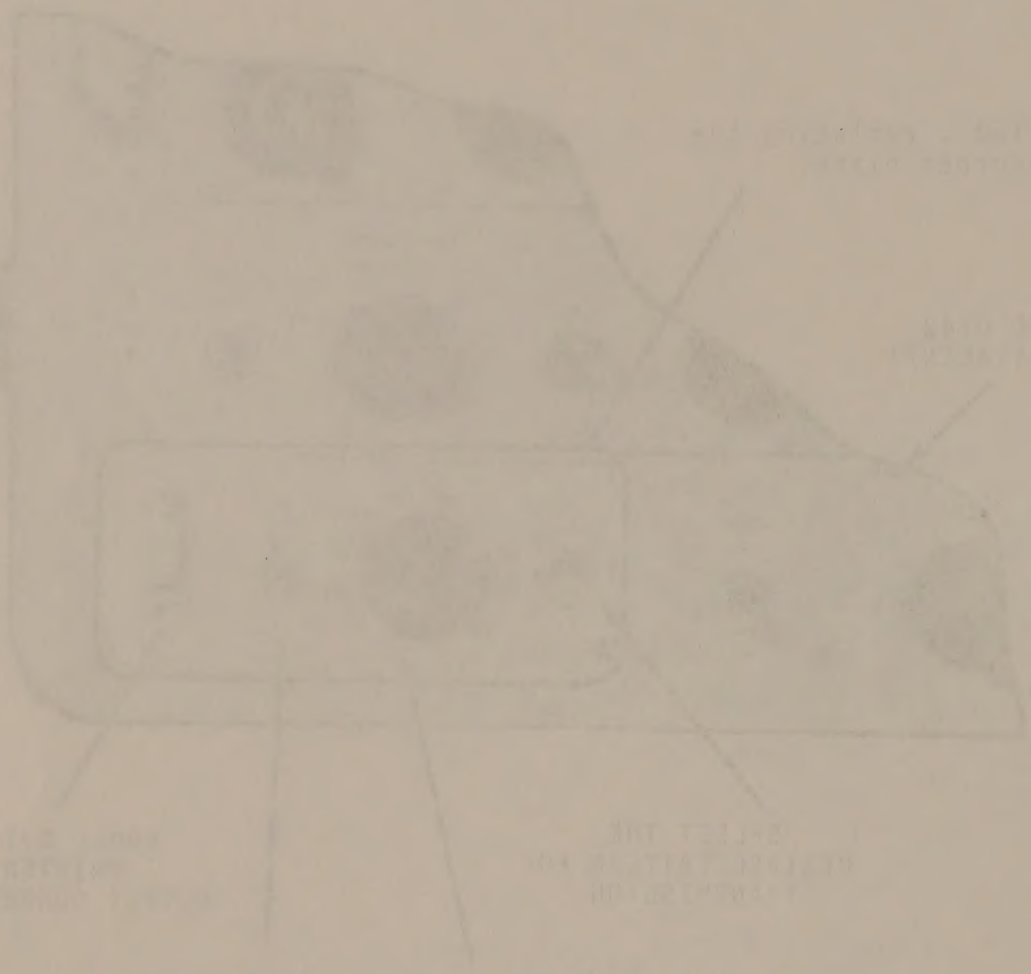


FIGURE 1. MODEL 15 FULL DUPLEX KIT SHOWN INSTALLED IN 914B DATA TEST SET.



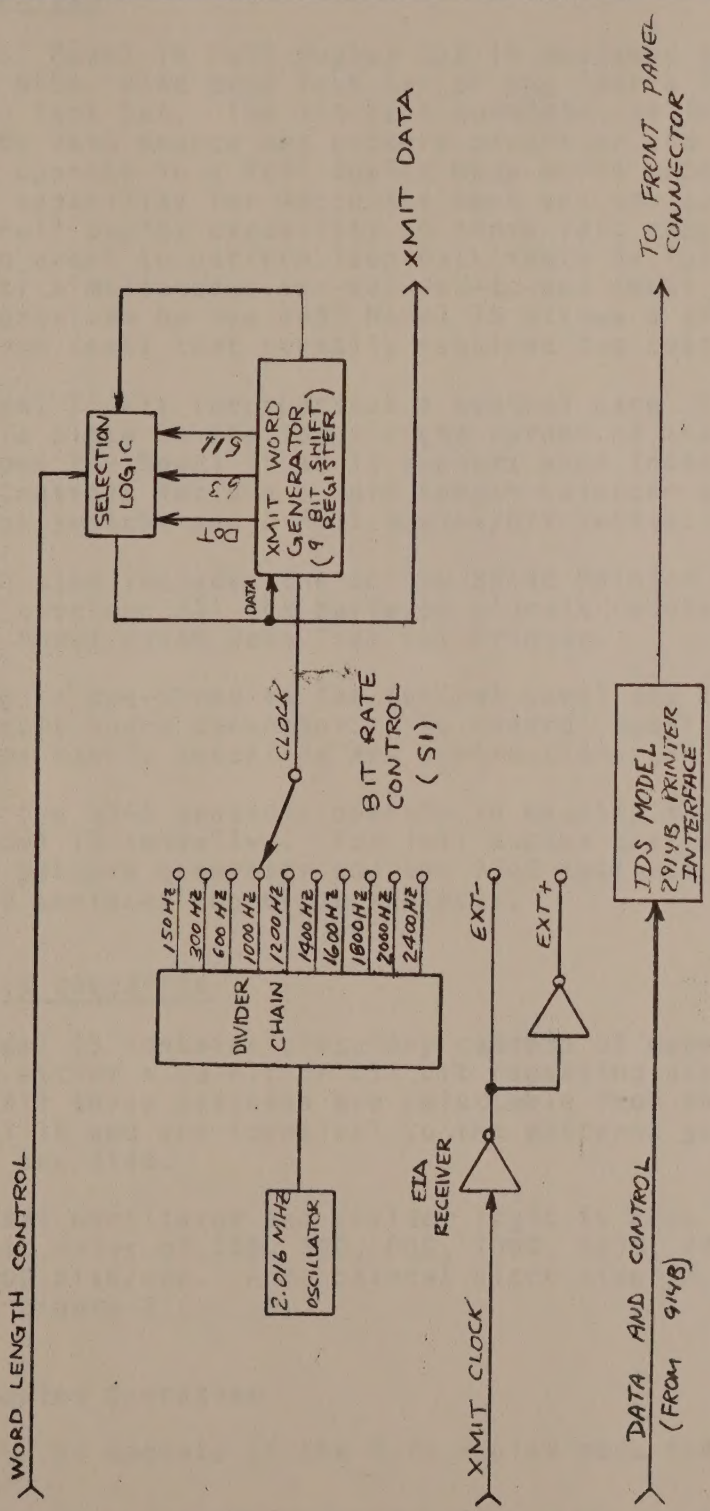
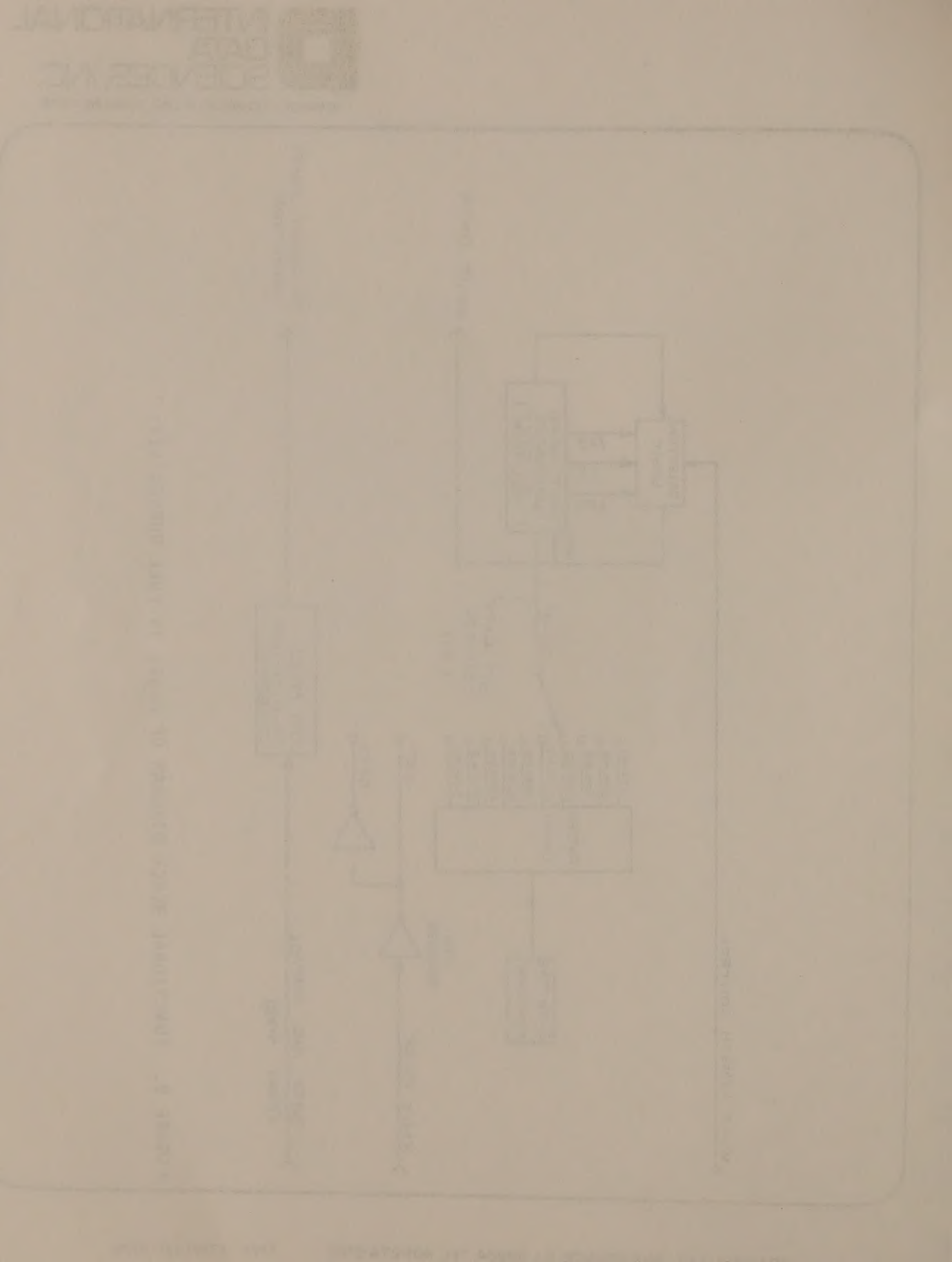


FIGURE 2. FUNCTIONAL BLOCK DIAGRAM OF MODEL 15 FULL DUPLEX KIT.



1.0 INTRODUCTION

The IDS' Model 15 Full Duplex Kit is designed for installation in any WECo. 914B Data Test Set or any Sierra 1914B Data Transmission Test Set. The kit is a complete, self-contained pseudo-random data source and pattern generator and allows the test set to operate in a full duplex mode while retaining the half duplex capability for which the test set was originally designed. Full duplex capability in these test sets is necessary in order to perform loop-back tests on full-duplex links, or for simultaneous two-way end-to-end tests. The added capability provided by the IDS' Model 15 allows a single test set to perform tests that normally required two test sets.

The Model 15 kit incorporates a control panel that replaces the removable plate in the lower right corner of the test set. Figure 1 shows the Model 15 as it appears when installed in the test set. Controls include a Word Length selector switch, a Bit Rate selector switch, and a Full Duplex/Off switch.

The kit also includes the unique 2914B Printer interface connector that provides all the buffered signals required to operate with an IDS Model 2914B Data Test Set Printer.

Cabling is pre-wired to the control panel and to a standard printed circuit board connector. The control panel, cabling, and connector are easily installed and instructions are contained herein.

All of the 914B controls operate in exactly the same manner with the Model 15 installed. For full duplex testing the Model 15 acts as the pattern generator and the 914B test set acts as the receiver and performs the error analysis.

2.0 MODEL 15 OPERATION

The Model 15 contains circuitry capable of generating a dot pattern and either a 63 bit or 511 bit repeating pseudo random pattern. All three patterns are selectable from the front panel of the Model 15 and are identical to the patterns generated and received by the 914B.

A crystal oscillator and divider logic is also provided which generates bit rates of 150, 300, 600, 1000, 1200, 1400, 1600, 1800, 2000 and 2400 bits/sec. A functional block diagram of the Model 15 is shown in Figure 2.

2.1 Full Duplex Operation

In order to operate in the full duplex mode the following steps are necessary.

2.1.1

Set the switch labeled Test Set Mode on the 914B to the Rcv-Ser position.

2.1.2

Set the switch labeled Word Length on the Model 15 to the desired transmitted word length and the switch labeled Word Length on the Model 914B to the desired received word length.

2.1.3

Set the switch labeled Bit Rate on the Model 15 to the desired transmitted bit rate and the switch labeled Bit Rate on the Model 914B to the desired received bit rate.

2.1.4

Set the switch labeled Full Duplex/Off on the Model 15 to the Full Duplex position.

Since the Model 15 contains a completely independent transmitter, it is possible to transmit and receive at two different data rates and word lengths if a 914B equipped with a Model 15 is available at each end of a full duplex communication channel.

2.2 Half Duplex or Simplex Mode

In order to operate the 914B in its normal half duplex or simplex mode, simply set the Full Duplex/Off switch on the Model 15 to the Off position.

3.0 MODEL 15 FRONT PANEL CONTROLS

The following switches are located on the Model 15 front panel. (See Figure 3).

3.1 Word Length

This switch controls the pattern that is transmitted by the Model 15. In the Dot position, an alternate mark-space pattern is transmitted. In the 63 position, a repeating 63 bit pseudo-random pattern is transmitted. Similarly, in the 511 position, a repeating 511 bit pseudo-random pattern is transmitted.

3.2 Bit Rate

The switch labeled Bit Rate is a 12-position rotary switch which controls the transmitted data rate. The 12 switch positions are labeled: 150, 300, 600, 1000, 1200, 1400, 1600, 1800, 2000, 2400, Ext +, and Ext -.

3.3 Full Duplex/Off

This switch allows the 914B to operate in a full duplex mode. Setting this switch to the Full Duplex position energizes the Model 15 transmitter. Setting the 914B Test Set mode switch to the Rcv-Ser position allows loop-around, full duplex testing. When this switch is set to the Off position, the 914B operates in its normal simplex or half duplex mode.

NOTE: The 914B Test Set Mode switch must not be set to the Trmt-Ser position when the Model 15 Full Duplex/Off switch is set to the Full Duplex position, since no data will be transmitted.

3.4 Printer

This 9-pin connector interfaces the Model 914B Data Test Set to the IDS' Model 2914B Data Test Set Printer and allows a hard copy of test results to be obtained.

4.0 INSTALLATION

The following is a step-by-step procedure for installing a Model 15 into a Model 914B Data Test Set (or a Model 1914B Transmission Test Set). Before installing the Model 15, completely check the 914B (or 1914B) for proper operation. Figure 4 is an interconnection diagram for the completed installation.

4.1 Installation Procedure

4.1.1

Remove the 914B from its case by means of the four non-removable screws located on the bottom of the unit. Remove the power supply for easy access.

4.1.2

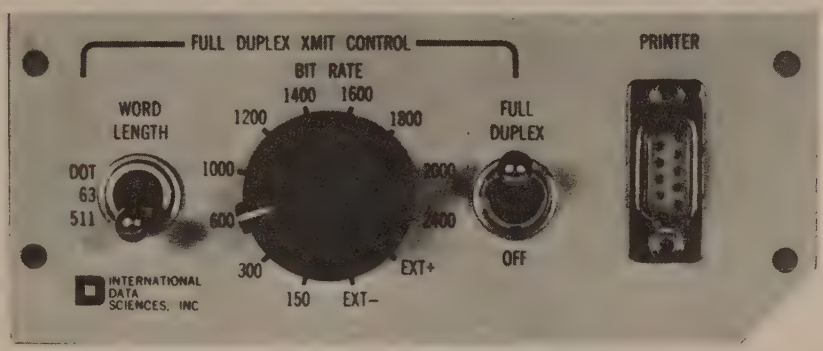
Remove the blank plate located in the bottom right corner of the 914B front panel.

4.1.3

Mount the Model 15 front panel, switch and cable in the bottom right corner of the 914B front panel.

4.1.4

Remove the card cage containing cards in positions CP1, CP2, CP3, CP4, CP5 and CP8 from the 914B by removing 7 screws. Remove CP5 and CP8 in preparation for installation of CP7.



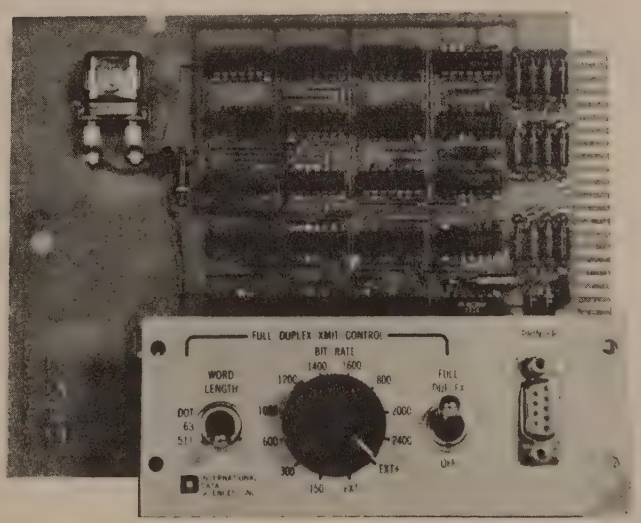


FIGURE 3. (TOP) MODEL 15 FRONT PANEL. (BOTTOM) MODEL 15 FRONT PANEL AND ASSOCIATED PRINTED CIRCUIT BOARD.

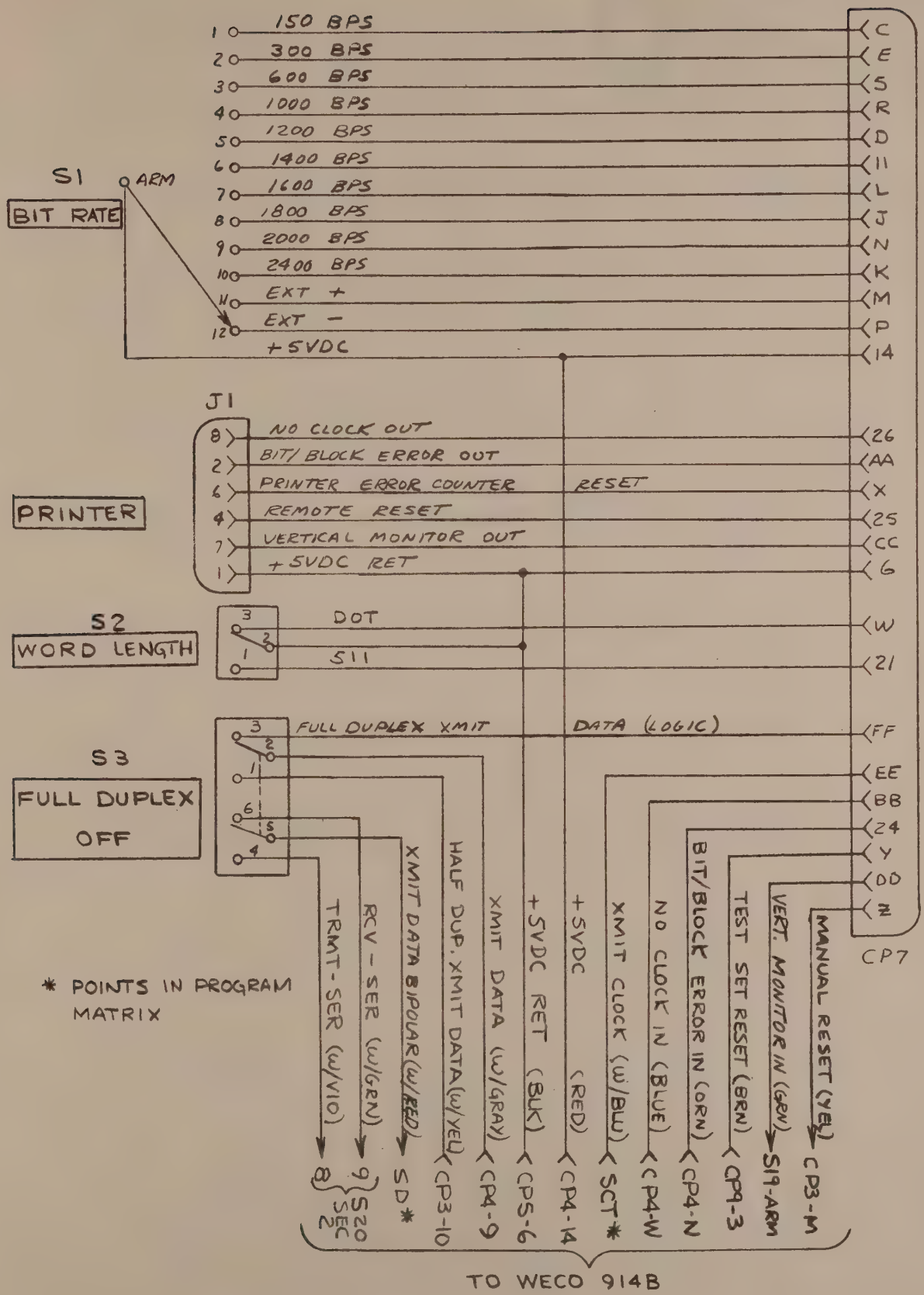


FIGURE 4 INTERCONNECTION DIAGRAM FOR MODEL 15 FULL DUPLEX KIT

4.1.5

Attach the connector at the end of the cable of the Model 15 into the card cage at position CP7 utilizing screws and nuts provided.

4.1.6

Take the Red wire already attached to connector CP7, pin 14 and solder the open end to connector CP4, pin 14.

4.1.7

Take the Black wire already attached to connector CP7, pin 6 and solder the open end to connector CP5, pin 6.

4.1.8

Remove the wire running from connector CP4, pin 9 to connector CP3, pin 10.

4.1.9

Solder the White/Gray wire labeled 5 from the Model 15, to connector CP4, pin 9.

4.1.10

Solder the White/Yellow wire labeled 4 from the Model 15, to connector CP3, pin 10.

4.1.11

Solder the Blue wire labeled 13 from the Model 15 to CP4, pin W.

4.1.12

Solder the Orange wire labeled 12 from the Model 15 to CP4, pin N.

4.1.13

Solder the Yellow wire labeled 14 from the Model 15 to CP3, pin M.

4.1.14

Remove the Green wire running from the rotary switch S20 (Test Set Mode switch) section 2, (second wafer away from the front panel) pin 8 (Note: label this pin for further reference; there is only one green wire on the section two wafer), to Program Matrix pin labeled SD.

4.1.15

Solder the White/Violet wire labeled 6 from the Model 15, to S20, section 2, pin 8.

4.1.16

Solder the White/Green wire labeled 7 from the Model 15, to S20, section 2, pin 9. (Note: pin 9 is the blank pin next to pin 8).

4.1.17

Remove the wire between the wiper of switch S27 (labelled Reset on the 914B Front panel), and pin 3 on the printed circuit board CP9. (mounted in back of Nixie Display)

4.1.18

Solder the Brown wire labeled 11 from the Model 15, to CP9, pin 3.

4.1.19

Solder the Green wire labeled 10 from the Model 15, to the wiper arm of switch S19, (labeled Vertical Monitor on the 914B front panel). The wiper arm may be identied by the White/Orange wire attached to it.

4.1.20

Solder the White/Red wire labeled 8 from the Model 15, to Program Matrix pin labeled SD, second from the top.

4.1.21

Solder the White/Blue wire labeled 9 connected to connector CP7, pin EE, to Program Matrix pin labeled SCT.

4.1.22

Re-assemble Model 914B and replace the card cage.

4.1.23

Insert Model 15 printed circuit board in card location CP7 so that after insertion the integrated circuits on the board are on the same side of the board as the other printed circuit boards.

4.1.24

Replace the existing 5 volt, 0.75 amp fuse, labeled F5, with a 5 volt, 1.0 amp fuse.

4.1.25

Replace the back cover using the four screws.

5.0 SELF TEST

With the Model 15 installed, the 914B Data Test Set is now capable of self test. This is accomplished by tieing the output of the transmitter to the receiver input. To do this simply insert shorting pins into the intersection of column 3, row SD, and column 3, row RD of the Program Matrix. The Model 15 transmitter output data will now be received by the 914B receiver and a loop-around test of the 914B itself can now be performed. Note that the Full Duplex/Off switch on the Model 15 must be set to Full Duplex and the Test Set Mode switch on the 914B must be set to the Rcv-Ser position.

5.1 Initial Conditions

Model 15

1. Set the Full Duplex/Off switch to Full Duplex.
2. Set the Bit Rate rotary switch to any arbitrary data rate.
3. Set the Word Length switch to 63 or 511.

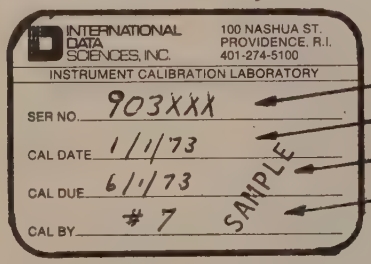
Model 914B

1. Set the Test Set Mode switch to Rcv-Ser.
2. Set the Counter switch to Bit Errors.
3. Set the Function switch to Phase Adjust.
4. Set the Bit Rate switch to the same data rate as Model 15.
5. Set the Signal Level switch to ±4V.
6. Set the Word Length switch to same word length as Model 15.
7. Set the Sample Width switch to .5 μs.
8. Set the Word Sync switch to Auto.
9. Insert a shorting pin at the intersection of column 3 and row SD of the Program Matrix.
10. Insert a shorting pin at the intersection of column 3 and row RD of the Program Matrix.

CALIBRATION AND REPAIR SERVICE

All units sold by International Data Sciences, Inc. are calibrated at the time of delivery. International Data Sciences, Inc. recommends a periodic calibration every six months thereafter performed by the Calibration Department at International Data Sciences, Inc. The cost of this service is $25 for each calibration. If the unit requires repairs that are not covered by the original warranty, then IDS will perform the repair at a charge of $12 per hour plus parts. Normal turn-around time for calibration is two weeks.

Equipment so calibrated will bear a gummed label, illustrated below, on the rear panel.



- Serial Number of unit calibrated
- Date calibrated
- Recommended next calibration date
- In-plant calibrator identifier

All units returned to IDS for calibration will be accepted only if transportation charges are prepaid. The purchaser is also responsible for all transportation charges incurred in returning the calibrated unit to the purchaser.

For fast service DAX, Mark IV or Emery Air Freight are recommended. If time is not a problem, UPS is recommended. Return address should be clearly stated and should include a person to the attention of whom unit will be shipped.

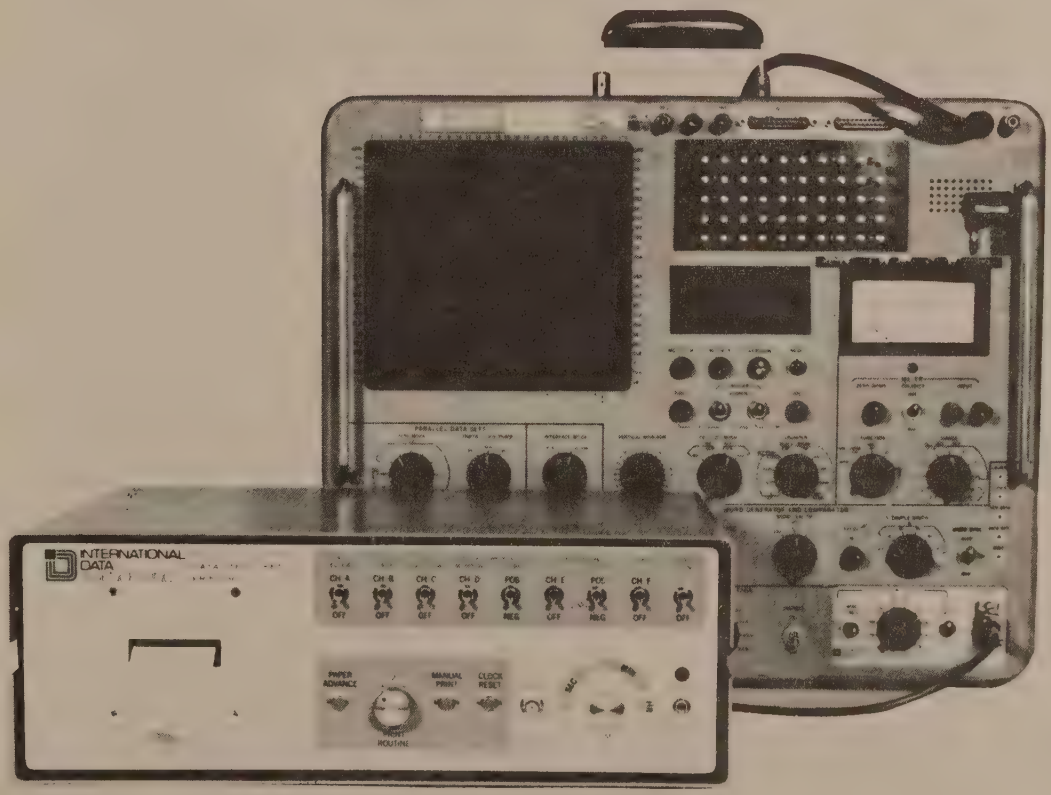
Shipping cartons with proper foam packing are available from IDS at a price of $10 each. The carton will facilitate shipping the equipment to be calibrated with a maximum of protection.

11. Adjust the Phase control until errors stop. The 914B Receiver is now locked to the Model 15 Transmitter and a loop-around self test is being performed.

5.2 Printer Interface Test

5.2.1

In order to completely test the Printer interface, an IDS' Model 2914B Data Test Set Printer is required. The test procedure is outlined in the Model 2914B operating manual. The figure below shows the Model 15 Kit installed and a Model 2914B printer plugged into the Model 15.



MODEL 2914B DATA TEST SET PRINTER SHOWN PLUGGED INTO A MODEL 15 FULL DUPLEX KIT WHICH HAS BEEN INSTALLED ON A WESTERN ELECTRIC 914B DATA TEST SET.

INTERNATIONAL DATA SCIENCES, INC.

ADVANCED TECHNIQUES IN DATA COMMUNICATIONS

WARRANTY

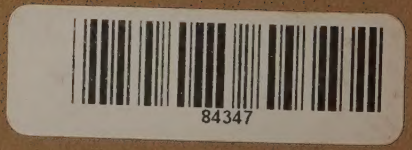
All International Data Sciences, Inc. instruments are warranted against defects in material, workmanship and component failures for a period of ninety days and against defects in material and workmanship for a period of one year. All units returned to IDS under this warranty require prepaid transportation charges. The purchaser is also responsible for all transportation charges incurred in returning the repaired unit to the purchaser.

Instruments to be returned under this Warranty require prior authorization by an International Data Sciences, Inc. representative or by the service manager of International Data Sciences, Inc.

International Data Sciences, Inc. reserves the right to make changes in design at any time without incurring any obligation to install same on units previously purchased.

This Warranty is expressly in lieu of all other obligations or liabilities on the part of International Data Sciences, Inc., and International Data Sciences, Inc. neither assumes nor authorizes any person to assume for them any other liability in connection with the sales of International Data Sciences, Inc. instruments.

100 NASHUA ST., PROVIDENCE, R.I. 02904, TEL. 401-274-5100 TWX (710) 381-0285



100 NASHUA ST., PROVIDENCE, R.I. 02904, TEL. 401-274-5100